**High School STEM Unit and Lesson Template**

This document is designed to aid educators in designing STEM centric units and lessons for any discipline. The items in the template describe the components of STEM centric units and lessons. STEM lessons will follow the 5E model for integrated STEM instruction. For more information regarding the 5E model, please view the STEM 2011 fall webinar at <http://mdk12.org/instruction/academies/fall_webinars_2011.html>

**Author(s):**

**Name of Local Education Agency and/or Institute of Higher Education:**

**Grade or Content Area(s):**

**Key Words:**

| **STEM Centric Unit Snapshot** | | | |
| --- | --- | --- | --- |
| **Unit Title** | **Content Overview** | **Content Standards** | **STEM Standards of Practice** |
|  |  |  |  |

***Overview:*** *This is a summary of what students will learn in the unit. It explains the unit’s focus and real world connection*.

***Enduring Understandings:*** *These go beyond discrete facts or skills to focus on larger concepts, principles, or processes. They are transferable - applicable to new situations within or beyond the subject.*

***Essential Questions****: Essential questions are open-ended questions that provoke inquiry about the core ideas for the unit. They are grade-level appropriate questions that prompt intellectual exploration of a topic.*

***Content Standards:*** *This section will list Maryland State Curriculum content standards from multiple disciplines that are addressed in the unit*

***Connections to the Maryland State STEM Standards of Practice:*** *This section identifies the essential skills and knowledge from STEM Standards of Practice that will be addressed in the unit.*

***Clarifications/Examples:*** *This component will provide extensions of the essential skills and knowledge found in the Maryland State Curriculum. These extensions will include examples as appropriate.*

Curriculum Writers do not need to complete this section. This section will be completed by MSDE staff.

***Connection to STEM Careers:*** *This section describes careers in the STEM fields that correlate with content covered in the unit.*

***Transdisciplinary Connections:*** *This section will broadly list the content areas the unit covers and suggest opportunities for real world connections between science, technology, engineering, mathematics, and other disciplines*.

***Suggested Student Outcomes****: These are the specific student outcomes for the unit and are aligned with but not limited to Maryland State Curriculum in science, technology, engineering, mathematics, and other disciplines. They describe the transferable knowledge and skills that students should understand and be able to do when the unit is completed. The outcomes are often components of more broadly-worded standards and sometimes address knowledge and skills not necessarily related to the standards. The lists of outcomes are not exhaustive, and the outcomes should not supplant the standards themselves. Rather, they are designed to help teachers “drill down” from the standards and augment as necessary, providing added focus and clarity for lesson planning purposes.*

***Vocabulary/Terminology/Concepts:*** *These are concepts and terms that will be encountered - often for the first time - over the course of the unit. The list is not comprehensive; it is meant to highlight terms that either are particular to the unit, are introduced there, or that play a large role in the work or content of the unit. These terms and concepts are usually implied by the standards, but not always made explicit in them.*

| ***Common Misconceptions***  *This component will provide insights into areas that have historically presented challenges for both the teacher providing the instruction and the student understanding the concept.* | | |
| --- | --- | --- |
| Topic/Standard/Concept | Misconception | Strategies to Address Misconception |
|  |  |  |

***Key Advances from Previous Grades/Courses****: Statements about what was learned in previous grades/course that will support student learning*.

**Lesson One**

The categories below can be copied to develop multiple lessons for a unit. Each person on the team should develop a minimum of one lesson for his/her content area and one lesson seed

***Lesson Title:***

***Content Area(s):***

***Estimated Time:***

***Lesson Overview****: This is a summary of what students will learn in the lesson. It explains the lesson’s focus and real world connection.*

***Enduring Understandings:*** *The enduring understandings should be the same as those identified for the unit.*

***Essential Questions:*** *The essential questions should be the same as those identified for the unit.*

***Content Standards:*** *This section will list Maryland State Curriculum content standards from multiple disciplines that are addressed in the lesson.*

***Connections to the Maryland State STEM Standards of Practice:*** *This section identifies the STEM Standards of Practice essential skills and knowledge that will be addressed in the lesson.*

***Suggested Student Outcomes****: These are the specific student outcomes for the lesson and are aligned with but not limited to Maryland State Curriculum in science, technology, engineering, mathematics, and other disciplines. They describe the transferable knowledge and skills that students should understand and be able to do when the unit is completed. The outcomes are often components of more broadly-worded standards and sometimes address knowledge and skills not necessarily related to the standards. The lists of outcomes are not exhaustive, and the outcomes should not supplant the standards themselves. Rather, they are designed to help teachers “drill down” from the standards and augment as necessary, providing added focus and clarity for lesson planning purposes.*

***Suggested Materials****: This section identifies materials needed to complete the lesson.*

***Engagement:*** *The engagement portion of the lesson captures students’ attention, activates prior knowledge, and introduces the real world connection (complex question, global issue, challenge, or real world problem) for the lesson.*

***Exploration****: The exploration portion of the lesson allows students to analyze the science, technology, engineering, and/or mathematics content needed to address the real world connection. Additionally, students apply a systemic approach and employ technological tools to develop answers or solutions to the real world connection*.

***Explanation:*** *The explanation portion of the lesson allows students to analyze and reflect on data/information, draw conclusions, and communicate understandings and possible solutions.*

***Extension / Elaboration****: The extension/elaboration portion of the lesson allows students to modify/refine procedures, prototypes, models, solutions, arguments, etc*.

***Evaluation:*** *Evaluation occurs throughout the 5E model. During evaluation students demonstrate understanding of concepts through performance-based task, participate in peer review, reflect on answer or solutions to the real world connection, and engage in self-evaluation*.

***Differentiation:*** *This section describes ways to modify the lesson for diverse learning styles.*

***Resources:*** *This section contains links to materials that are intended to support content instruction in this lesson.*

**Lesson Two**

The categories below can be copied to develop multiple lessons for a unit. Each person on the team should develop a minimum of one lesson for his/her content area and one lesson seed

***Lesson Title:***

***Content Area(s):***

***Estimated Time:***

***Lesson Overview****: This is a summary of what students will learn in the lesson. It explains the lesson’s focus and real world connection.*

***Enduring Understandings:*** *The enduring understandings should be the same as those identified for the unit.*

***Essential Questions:*** *The essential questions should be the same as those identified for the unit.*

***Content Standards:*** *This section will list Maryland State Curriculum content standards from multiple disciplines that are addressed in the lesson.*

***Connections to the Maryland State STEM Standards of Practice:*** *This section identifies the STEM Standards of Practice essential skills and knowledge that will be addressed in the lesson.*

***Suggested Student Outcomes****: These are the specific student outcomes for the lesson and are aligned with but not limited to Maryland State Curriculum in science, technology, engineering, mathematics, and other disciplines. They describe the transferable knowledge and skills that students should understand and be able to do when the unit is completed. The outcomes are often components of more broadly-worded standards and sometimes address knowledge and skills not necessarily related to the standards. The lists of outcomes are not exhaustive, and the outcomes should not supplant the standards themselves. Rather, they are designed to help teachers “drill down” from the standards and augment as necessary, providing added focus and clarity for lesson planning purposes.*

***Suggested Materials****: This section identifies materials needed to complete the lesson.*

***Engagement:*** *The engagement portion of the lesson captures students’ attention, activates prior knowledge, and introduces the real world connection (complex question, global issue, challenge, or real world problem) for the lesson.*

***Exploration****: The exploration portion of the lesson allows students to analyze the science, technology, engineering, and/or mathematics content needed to address the real world connection. Additionally, students apply a systemic approach and employ technological tools to develop answers or solutions to the real world connection*.

***Explanation:*** *The explanation portion of the lesson allows students to analyze and reflect on data/information, draw conclusions, and communicate understandings and possible solutions.*

***Extension / Elaboration****: The extension/elaboration portion of the lesson allows students to modify/refine procedures, prototypes, models, solutions, arguments, etc*.

***Evaluation:*** *Evaluation occurs throughout the 5E model. During evaluation students demonstrate understanding of concepts through performance-based task, participate in peer review, reflect on answer or solutions to the real world connection, and engage in self-evaluation*.

***Differentiation:*** *This section describes ways to modify the lesson for diverse learning styles.*

***Resources:*** *This section contains links to materials that are intended to support content instruction in this lesson.*

**Lesson Seeds**

Lesson seeds are ideas that can be used to build a lesson. They are designed to generate evidence of student understanding and give teachers ideas for developing their own activities. Lesson seeds are not meant to be all-inclusive, nor are they substitutes for instruction.

***Topic:***

***Content Area(s):***

***Lesson Seed Overview****: This is a summary of the lesson seed. It provides a brief explanation of the lesson seed’s focus and real world connection.*

***Enduring Understandings:*** *The enduring understandings should be the same as those identified for the unit.*

***Essential Questions:*** *The essential questions should be the same as those identified for the unit.*

***Content Standards:*** *This section will list Maryland State Curriculum content standards from multiple disciplines that are addressed in the lesson seed.*

***Connections to the Maryland State STEM Standards of Practice:*** *This section identifies the STEM Standards of Practice essential skills and knowledge that will be addressed in the lesson seed.*

***Engagement:*** *The engagement portion of the lesson seed provide ideas that captures students’ attention, activates prior knowledge, and introduces the real world connection (complex question, global issue, challenge, or real world problem).*

***Exploration****: The exploration portion of the lesson seed allows students to analyze the science, technology, engineering, and/or mathematics content needed to address the real world connection. Additionally, students apply a systemic approach and employ technological tools to develop answers or solutions to the real world connection*.

***Explanation:*** *The explanation portion of the lesson seed allows students to analyze and reflect on data/information, draw conclusions, and communicate understandings and possible solutions.*

***Extension / Elaboration****: The extension/elaboration portion of the lesson seed allows students to modify/refine procedures, prototypes, models, solutions, arguments, etc*.

***Evaluation:*** *Evaluation occurs throughout the 5E model. During evaluation students demonstrate understanding of concepts through performance-based task, participate in peer review, reflect on answer or solutions to the real world connection, and engage in self-evaluation*.

***Differentiation:*** *This section describes ways to modify the lesson seed for diverse learning styles.*

***Resources:*** *This section contains links to materials that are intended to support content instruction in this lesson seed.*